Seminar

Nanotechnology - Bottom Up and Top Down Approaches for Interacting with Molecules

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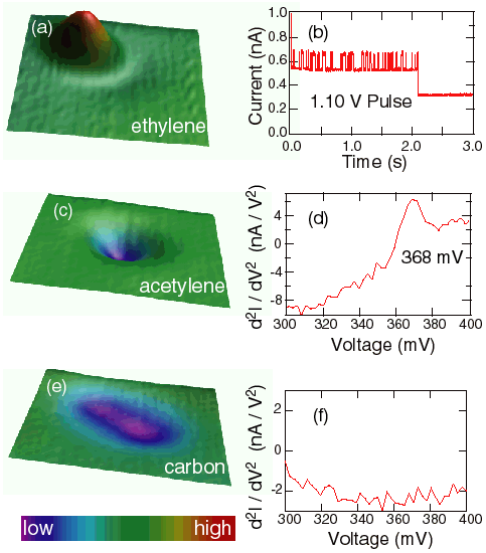
Date: Monday, January 28, 2002

Time: 11:00 AM

Location: Technology Building, Room A362



Abstract:

Nanotechnology holds great promise. Future generations of electronics may rely on single molecules to perform as nanoscopic electronic devices and chemistry and biology wet labs will be transformed into labs-on-a-chip capable of analyzing single molecules. There are two complementary strategies for reaching these milestones, top-down and bottom-up nanofabrication. This talk explores both. A homebuilt ultrahigh vacuum variable temperature scanning tunneling microscope (STM) enables us to perform single molecule chemistry and vibrational spectroscopy. Additionally, a new vibrationally mediated mechanism for negative differential resistance on single pyrrolidine molecules was discovered. Standard top-down nanofabrication tools are used to fabricate microfluidic devices for on-chip separation of biomolecules. We have developed a diffusion-based strategy for separating protein mixtures without denaturing the proteins. Furthermore, second generation entropic recoil devices are under development to enhance the separation efficiency for DNA mixtures.

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